

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12757

LOCALITY

State: USVI

Sub-locality: Southern Approaches to St. Croix

2015

CHIEF OF PARTY
Timothy Battista

LIBRARY & ARCHIVES

DATE: April 2015

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State: **USVI**

General Locality: **Caribbean Sea**

Sub-Locality: **Southern Approaches to St. Croix**

Scale: **1:40,000** Date of Survey: **March 27 to March 31, 2015**

Instructions Dated: **4 March 2015** Project Number: **M-I907-NF-15**

Vessel: **NOAA Ship *Nancy Foster***

Chief of Party: **Timothy Battista**

Surveyed by: **CCMA Biogeography Branch**

Soundings by: **Kongsberg EM710**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A**

Automated Plot: **N/A**

Verification by:

Soundings in: **Meters at MLLW**

Remarks:

- 1) All Times are in UTC.
- 2) This is a Coral Reef Mapping Project and Hydrographic Survey.

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>.

TABLE OF CONTENTS

A.	AREA SURVEYED	1
A1.	Survey Limits.....	1
A2.	Survey Purpose	1
A3.	Survey Quality	1
A4.	Survey Coverage.....	1
A5.	Survey Statistics.....	2
A6.	Shoreline	3
A7.	Bottom Samples.....	3
B.	DATA ACQUISITION AND PROCESSING.....	3
B1.	Equipment and Vessels.....	3
B1.a	Vessels	3
B1.b	Equipment.....	4
B2.	Quality Control	5
B2.a	Crosslines.....	5
B2.b	Uncertainty.....	5
B2.c	Junctions	6
B2.d	Sonar QC Checks.....	8
B2.e	Equipment Effectiveness	8
B2.f	Factors Affecting Soundings.....	8
B2.g	Sound Speed Methods.....	9
B2.h	Coverage Equipment and Methods.....	11
B3.	Echo Sounding Corrections	11
B3.a	Corrections to Echo Soundings.....	11
B3.b	Calibrations.....	11
B4.	Backscatter.....	11
B5.	Data Processing.....	12
B5.a	Software Updates	12
B5.b	Surfaces.....	12
C.	VERTICAL AND HORIZONTAL CONTROL	12
C1.	Vertical Control	12
C2.	Horizontal Control	13
D.	RESULTS AND RECOMMENDATIONS.....	13
D1.	Chart Comparison.....	13
D1.a	Raster Charts.....	13
D1.b	Electronic Navigational Charts.....	6
D1.c	AWOIS Items.....	18
D1.d	Charted Features	18
D1.e	Uncharted Features	18
D1.f	Dangers to Navigation	18

D1.g	Shoal and Hazardous Features	18
D1.h	Channels.....	18
D1.i	Bottom Samples	18
D2.	Additional Results.....	18
D2.a	Shoreline	18
D2.b	Prior Surveys.....	18
D2.c	Aids to Navigation	18
D2.d	Overhead Features	18
D2.e	Submarine Features.....	19
D2.f	Ferry Routes and Terminals.....	19
D2.g	Platforms	19
D2.h	Significant Features	20
D2.i	Construction and Dredging.....	21
D3.	New Survey Recommendations.....	21
D3.a	Inset Recommendations	21
E.	APPROVAL SHEET	21

LIST OF FIGURES

Figure 1.	H12757 survey outline.....	2
Figure 2.	TVU QC Histograms for 32m CUBE surface	6
Figure 3.	W00199 and H12757 overlap area and difference section	7
Figure 4.	W00199 and H12757 difference surface statistics.....	7
Figure 5.	7125-SV2 and EM710 difference statistics	8
Figure 6.	Spatial distributuion of H12757 uCTD casts	9
Figure 7.	EM710 SVP71 vs uCTD real-time SV comparisons.....	10
Figure 8.	H12757 SV Cast Plot.....	10
Figure 9.	EM710 seafloor backscatter before and after applying sector adjustments....	11
Figure 10.	25644 chart comparison.....	14
Figure 11.	25641 chart comparison East.....	14
Figure 12.	25641 chart comparison West.....	15
Figure 13.	25640 chart comparison West.....	15
Figure 14.	RNC 25640 vs ENC US3PR10M chart comparison.....	16
Figure 15.	RNC 25641 vs ENC US4PR11M chart comparison.....	17
Figure 16.	RNC 25644 vs ENC US5PR13M chart comparison.....	17
Figure 17.	Cable route crossing.....	19
Figure 18.	Surveyed pinnacles	20

LIST OF TABLES

Table 1.	H12757 survey limits.....	1
Table 2.	H12757 hydrographic survey statistics.....	2
Table 3.	H12757 days of acquisition	3
Table 4.	Vessel specifications.....	4
Table 5.	Equipment used.....	4
Table 6.	TPU values for tide and sound speed.....	5
Table 7.	H12757 MBES surfaces.....	12
Table 8.	Tide stations.....	12
Table 9.	HIPS water level files	13
Table 10.	HIPS zoning files.....	13
Table 11.	RNCs compared to H12757.....	13
Table 12.	ENCs compared to H12757	16

ACRONYMS AND ABBREVIATIONS

AtoN	Aid to Navigation
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DN	Day Number
DtoN	Danger to Navigation
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSSD	Hydrographic Surveys Specifications and Deliverables
IHO	International Hydrographic Organization
MBES	Multibeam Echosounder System
MLLW	Mean Lower Low Water
NAD83	North American Datum of 1983
QC	Quality Control
RNC	Raster Navigational Chart
TPU	Total Propagated Uncertainty
UTM	Universal Transverse Mercator
RNC	Raster Navigation Chart
ENC	Electronic Navigation Chart

Descriptive Report to Accompany Hydrographic Survey H12757

Project M-I907-NF-15

Locality: Caribbean Sea

Sub-locality: Southern Approaches to St. Croix

Scale 1:40,000

April 2015

NOAA Ship Nancy Foster

Chief Scientist: Tim Battista

Lead Hydrographer: Mike Stecher

A. AREA SURVEYED

The Center for Coastal Monitoring and Assessment (CCMA) conducted hydrographic survey operations in the Caribbean Sea, along the southern approaches to St. Croix, US Virgin Islands. The survey H12757 was conducted in accordance with the Hydrographic Survey Project Instructions dated March 04, 2015 for project M-I907-NF-15.

A1. SURVEY LIMITS

The extents of the H12757 survey limits are listed in Table 1.

Table 1. H12757 survey limits

Northeast Limit	Southwest Limit
17.86 N	17.56 N
64.38 W	64.97 W

A2. SURVEY PURPOSE

The project is being conducted in support of the National Center for Coastal Ocean Science (NCCOS) to provide bathymetric data of critical benthic habitats in selected areas off of the coast of St. Thomas, USVI. Bathymetric data from the project was collected with multibeam echosounder (MBES) and will be utilized by the Office of Coast Survey (OCS) to update the nautical charts in the surveyed area.

A3. SURVEY QUALITY

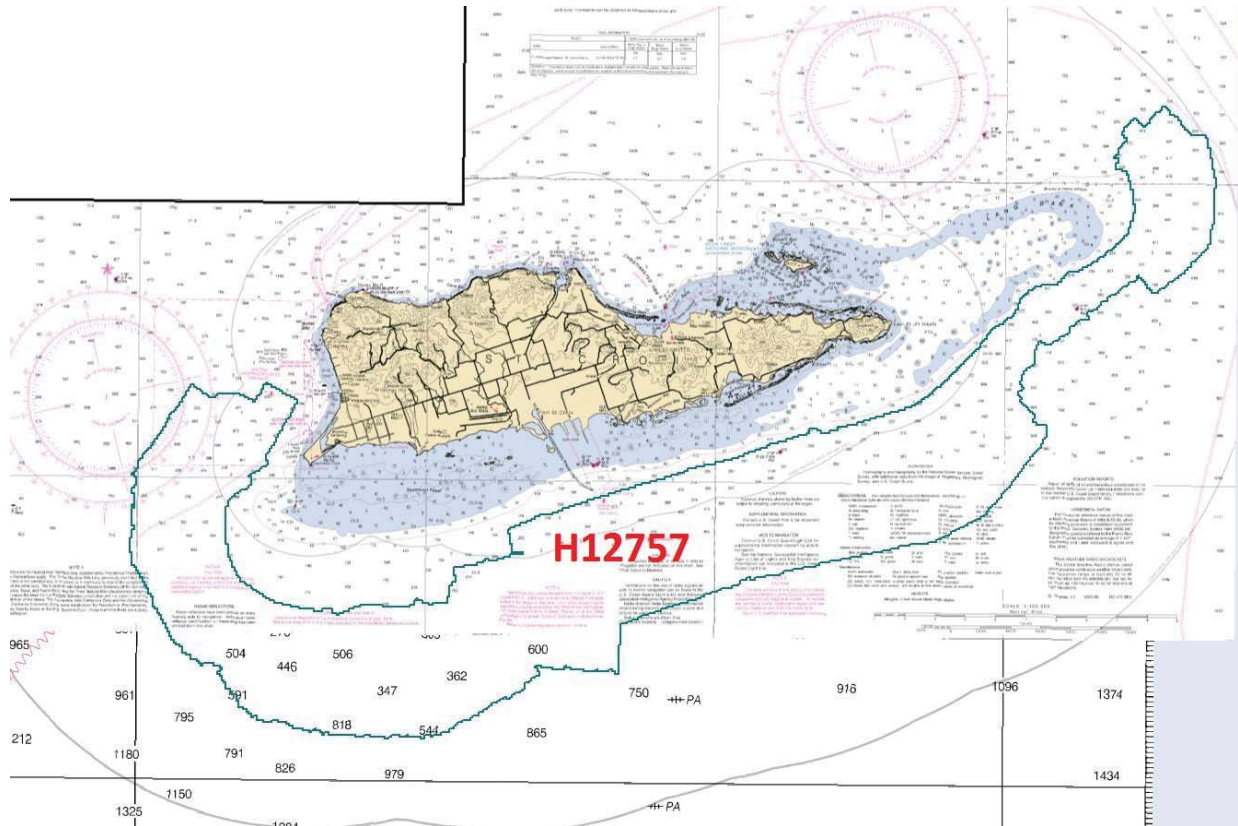
The entire survey is adequate to supersede previous surveys.

A4. SURVEY COVERAGE

As per the Project Instructions, this survey was conducted using the complete coverage MBES specification as defined in the Hydrographic Survey Specifications and Deliverables April 2014 (HSSD). While conducting the survey, bathymetric coverage was monitored by creating CUBE surfaces with 8m, 16m and 32m resolutions as per HSSD. Sounding densities generally meet the 95% of all nodes population criteria, except in areas where MBES data were shadowed by features of significant height.

The entire survey sheet as per the Project Instructions was completed. A fill plan was created for all holidays greater than the required specifications. There are no holidays over the tops of potentially significant features. For depths greater than 30m, some insignificant holidays are present. Water depths for sheet H12757 were between approximately 300-1635m. The *Nancy Foster's* EM710 MBES was used to survey the entire sheet.

Figure 1. H12757 Survey limits



A5. SURVEY STATISTICS

Detailed survey statistics for H12757 are provided in Table 2.

Table 2. H12757 hydrographic survey statistics

Survey Statistics	MBES
MBES main scheme (nm)	202.3
Crosslines (MBES nm)	37.4
Additional full coverage MBES (nm)	0
Additional full coverage MBES crosslines (nm)	0
Number of item investigations that required additional survey effort	0
Number of bottom samples	0
Total number of square nautical miles	169.3

Data acquisition was conducted from March 27, 2015 (DN 089) to March 31, 2015 (DN 091). Table 3 lists specific dates of survey and patch test data acquisition. Patch test data was used to determine system biases in support of the survey and was completed during the Sea Acceptance Test (SAT) prior to this cruise.

Table 3. H12757 days of acquisition

Dates of Acquisition	
March	27-31, 2015
Dates of Patch Test Acquisition	
March	10, 2015

A6. SHORELINE

Shoreline investigation was not required for M-I907-NF-15.

A7. BOTTOM SAMPLES

Bottom Samples were not required for M-I907-NF-15.

B. DATA ACQUISITION AND PROCESSING


B1. EQUIPMENT AND VESSELS

The M-I907-NF-15 *Data Acquisition and Processing Report* (DAPR), submitted under supplemental reports, cover equipment details and vessel information as well as the data acquisition and processing procedures used for this survey. There were no vessel or equipment configurations used during data acquisition that deviated from those described in the DAPR.

B1.a Vessels

The vessel used during this survey is listed in Table 4.

Table 4. Vessel specifications

NOAA Ship Nancy Foster	
	
Hull Number	R352
Builder	McDermott, Inc
Year Built	1990
Weight	1190 long tons
Length Overall	187'
Beam	40'
Draft, Maximum	11.2'
Cruising Speed	10.5 knots
Max Survey Speed	7 knots

B1.b Equipment

Equipment systems used during data acquisition are listed in Table 5.

Table 5. Equipment used

Type	Manufacturer	Model
Multibeam Echosounder	Kongsberg	EM710
Surface Sound Speed	Reson	SVP-71
Primary Sound Speed Profiler	OceanScience	uCTD
Secondary Sound Speed Profiler	Sea-Bird	SBE-19Plus
Positioning & Attitude	Applanix	POS/MV 320 v4
Positioning & Attitude	Trimble	DSM132

B2. QUALITY CONTROL

Overall, the survey data showed acceptable internal consistency. Results from the crossline analysis, final CUBE surface uncertainties, the Total Vertical Uncertainties (TVU QC), and standard deviation statistics computed for the EM710 indicate internal consistency of the MBES data. Additionally, chart and junction survey comparisons with previously collected MBES data support data confidence.

B2.a Crosslines

A total of 37.4 nautical miles of crosslines, or 18.4% of all survey lines, were run for analysis of survey accuracy. Crosslines were run in a direction of less than 45 degrees to main scheme lines across most of the surveyed area, providing a good representation for analysis of consistency and IHO conformance. For water depths encountered in H12757 IHO Order 2 was used for MBES IHO compliance.

Crossline analysis was performed using the CARIS Hydrographic Information Processing System (HIPS) QC Report tool. This tool compares crossline data to a gridded surface and reports results by beam number and IHO compliance. Crosslines were compared to a 16m CUBE surface encompassing mainscheme MBES data. The QC Report plots are included in Separate II Digital Data. The results of the analysis meet the requirements as stated in the HSSD.

B2.b Uncertainty

Survey specific uncertainty parameters for tide and sound speed are included in Table 6. Additional discussion of these parameters is included in the M-I907-NF-15 DAPR.

Table 6. TPU values for tide and sound speed

Total Propagated Uncertainty Computation in CARIS HIPS*		
<i>Tide Values</i>	Uncertainty* (m)	Day Number Range
Tide Value Measured	0.02	all
Tide Value Zoning	0.06	all
<i>Sound Speed Values</i>	Uncertainty* (m/s)	
Sound Speed Measured (SN 5510)	4.0	all
Surface Sound Speed	1.0	all

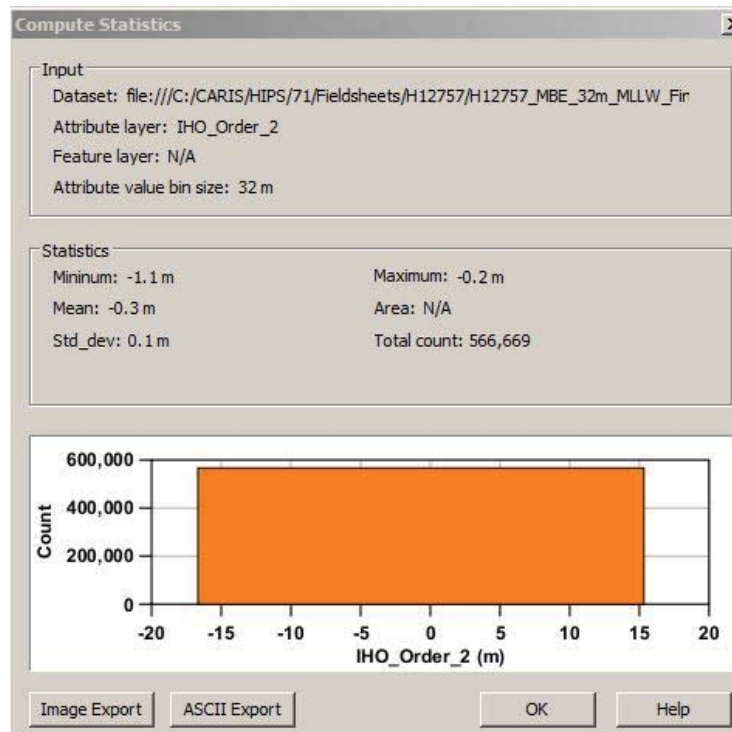
During surface finalization in HIPS, the "greater of the two" option was selected, where the calculated uncertainty from Total Propagated Uncertainty (TPU) is compared to the standard deviation (StdDev) of the soundings influencing the node, and where the greater value is assigned as the final uncertainty of the node. The uncertainty of the finalized surface increased for nodes where the StdDev of the node was greater than the TPU. The resulting calculated uncertainty values of all nodes in the 16m finalized surfaces range from 1.94m to 31.15m. The maximum uncertainty values are associated with a high standard deviation in the depth surface caused by steep and irregular seafloor features.

To determine if surface grid nodes met IHO Order 2 specifications a TVU QC check was performed in addition to the HIPS QC Report tool. This routine is used to identify nodes in the finalized CUBE surfaces that have estimated uncertainties that exceed specifications.

Specifically, the TVU QC layer compares the estimated uncertainty of the depth to the allowable uncertainty of the depth estimate node by node.

This routine uses the ratio method which visualizes the ratio of the uncertainty at a node to the maximum allowed IHO uncertainty for each node via a computed layer in CARIS. The TVU QC layer scales with depth and demonstrates what fraction of the total allowable error budget is consumed by the estimated uncertainty. The TVU QC layers are labeled as IHO_Order_2 and reside as child layers within the finalized 16m and 32m CUBE surfaces. The TVU QC layers were reviewed with filters set to -1 to -100, and areas that had populated node values were further examined by the data processor. As shown in Figure 2, the results from the TVU QC method show that the IHO_Order_2 TVU QC layer standard deviation (0.1m) and mean value (-0.3m) meet IHO Order 2 specifications.

Figure 2. TVU QC histograms for 32m CUBE surface



B2.c Junctions

One junction survey for H12757 was noted in the project instructions, survey W00199. A 16m bin sized difference surface was created between the W00199 BAG and the current H12757 finalized CUBE surface. A surface statistics calculation was performed; the resulting StdDev and min/max outliers are noticeably high (fig. 4). A possible reason being is that a very steep slope and erosion feature were part of the statistics calculation. The values are reasonable though for the water depths surveyed (480m-850m) when looked at across the sloped area with the section tool and the difference surface enabled, as depicted in figure 3.

Figure 3. W00199 and H12757 overlap area (hazle) and difference section

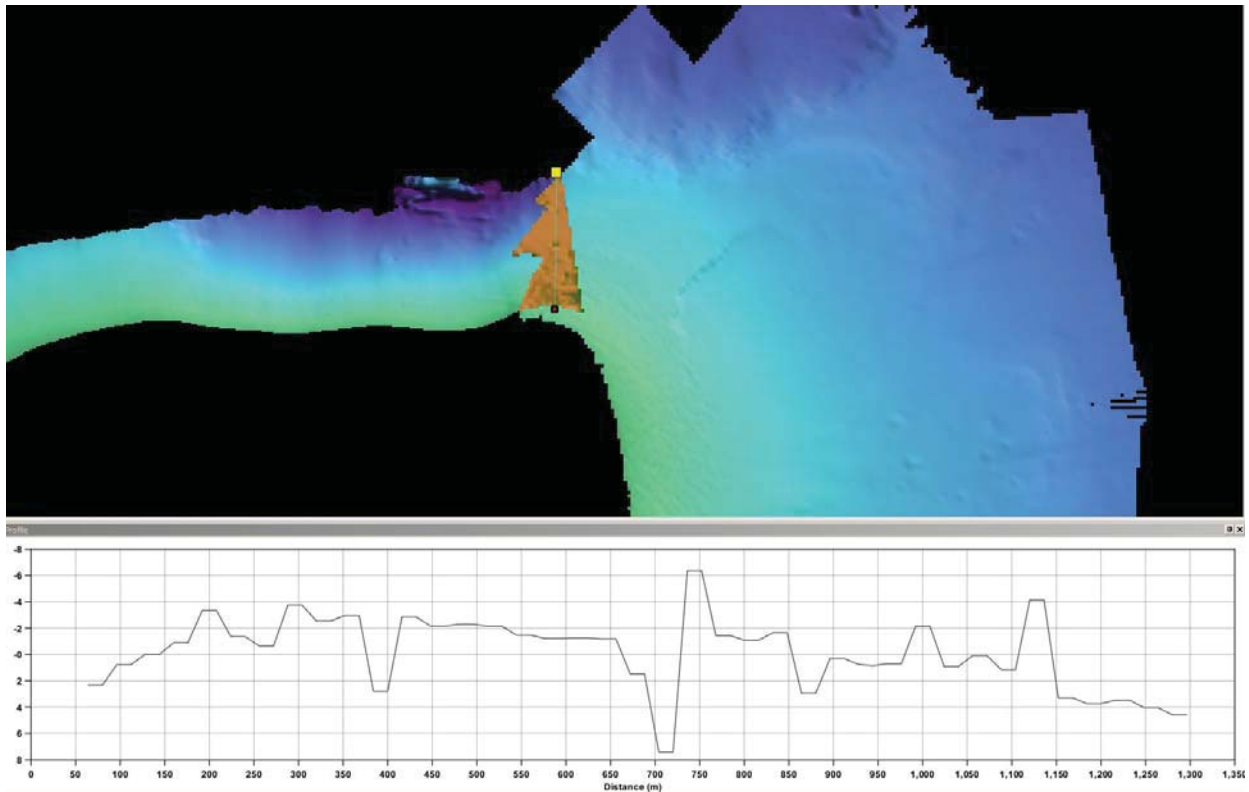
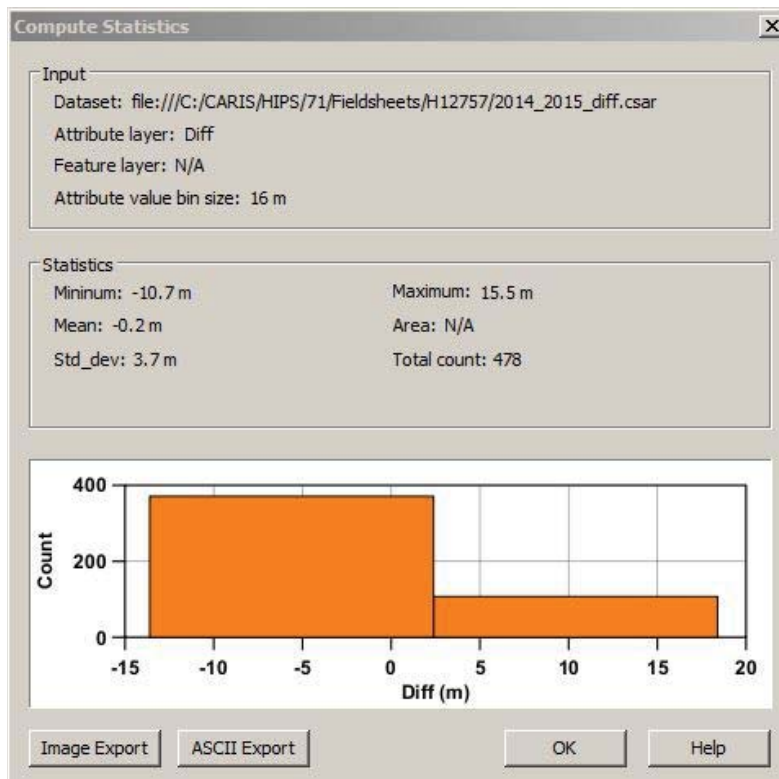


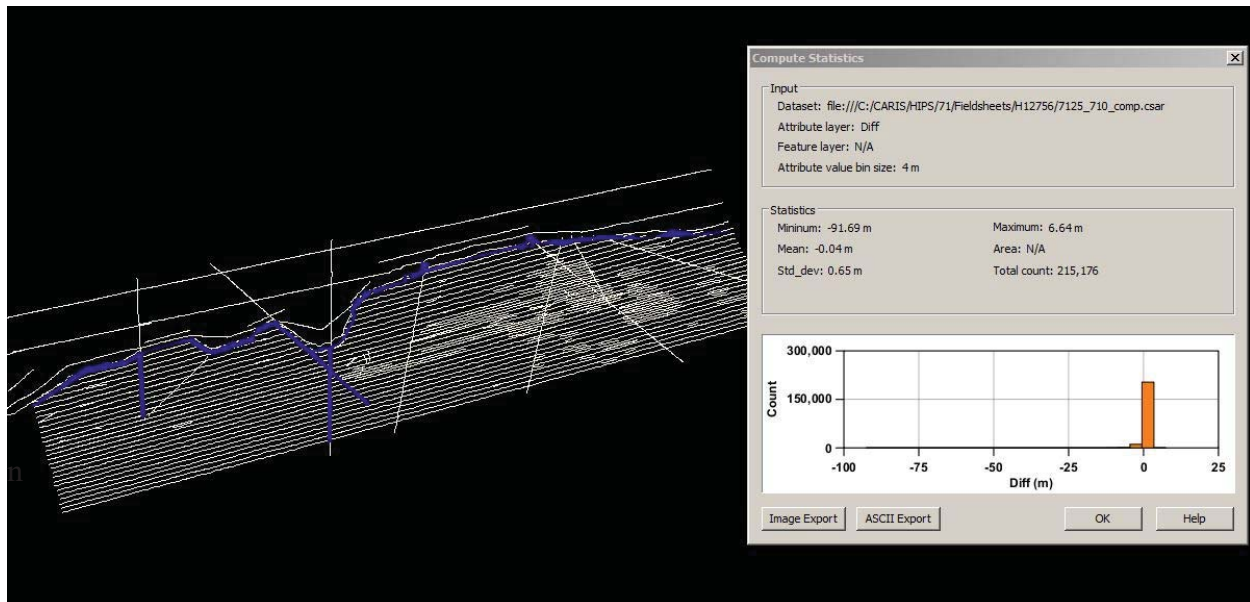
Figure 4. W00199 and H12757 difference surface statistics



B2.d Sonar QC Checks

Within the H12756 survey area, there was some 7125-SV2 overlap with the EM710 to allow for a 4m difference surface comparison. Surface statistics were calculated on the 4m difference surface with an agreeable StdDev of 0.65m. Additional sonar system quality control checks are discussed in the quality control section of the M-I907-NF-15 DAPR.

Figure 5. 7125-SV2 and EM710 difference surface statistics



B2.e Equipment Effectiveness

Overall the EM710 performed well, though on some occasions there was noise observed, which was attributed to sea states and cavitation under the hull. Kongsberg operation is much more hands-off than the Reson systems; the SIS software performs automatic adjustments as needed. The only adjustments made in real-time were to the vessel speed, and to the swath width to ensure sufficient sounding density and data quality. Much of the mapping was along a sharp slope, therefore the down sloping swath was restricted to prevent sparse data density and poor angles of incidence. For example, if the ship surveyed with the downslope to the starboard side, the swath would be constrained such that starboard was limited to 35° to 45°, while port (upslope) was maintained at 60° or less. In deeper waters, the swath width was also restricted to increase sounding density when the automatic ping mode defaulted to “very deep” or “extradeep”.

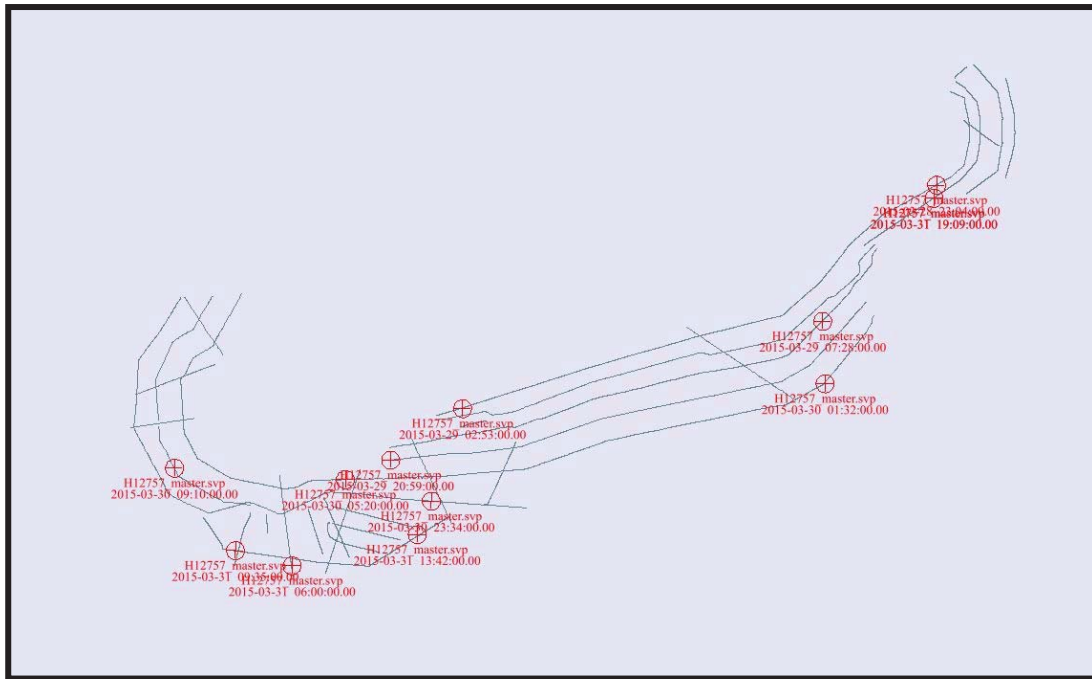
B2.f Factors Affecting Soundings

The EM710 data used real time heave only, otherwise no other factors affected soundings for H12757.

B2.g Sound Speed Methods

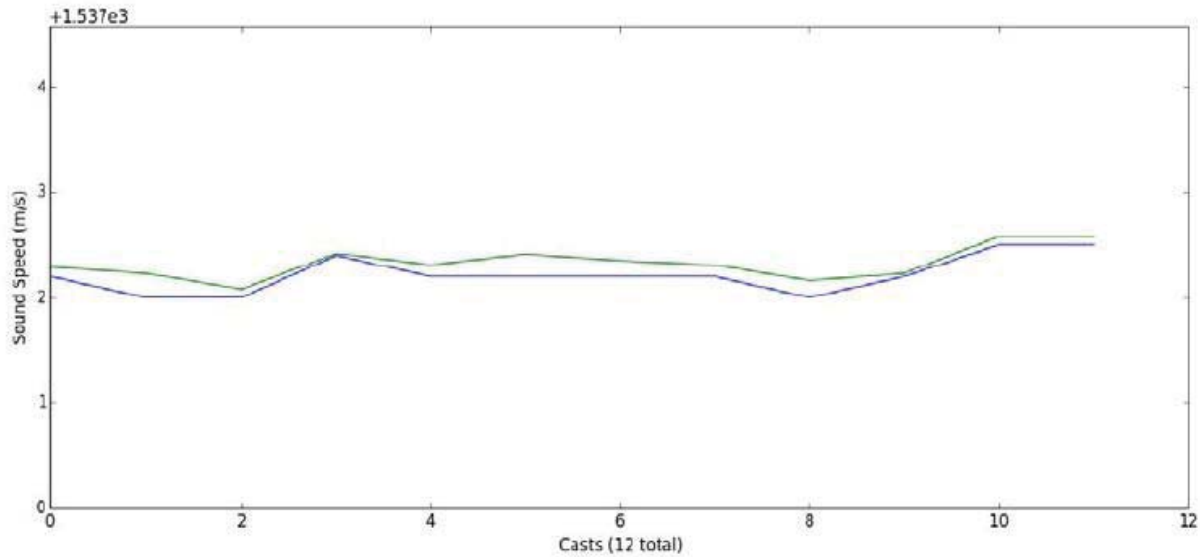
An OceanScience uCTD was the primary sound velocity acquisition device. The uCTD were deployed at no more than 5 hour increments during survey while underway and actions were taken to try and distribute the casts evenly throughout out the survey area. Additional discussion of sound speed methods can be found in the M-I907-NF-15 DAPR.

Figure 6. Spatial distribution of H12757 uCTD casts



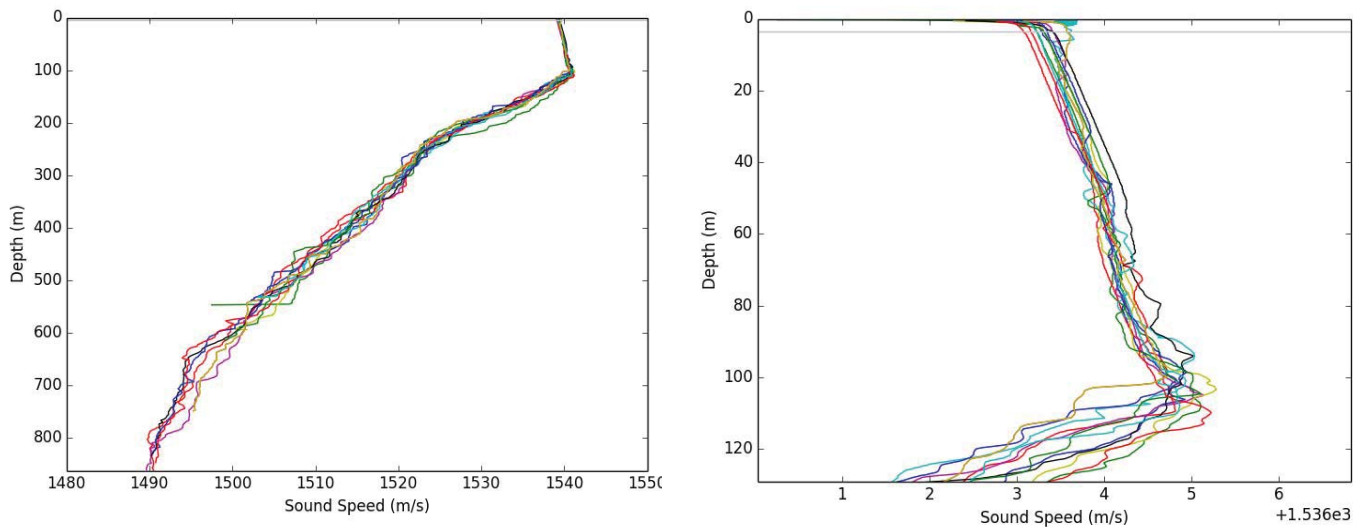
Comparisons between the uCTD data and real-time transducer level sound speed sensors were performed via a python utility for both MBE systems. The utility pulls uCTD surface sound velocity from the casts and then compares that value with the logged surface sound speed stored in the HDCS data files at the same instance in time. Figure 7 shows the comparisons between 12 uCTD casts and the SVP71 that provides sound speed to the EM710. Of 13 total uCTD casts (green), 12 were acquired during EM710 acquisition and are used to compare to the SVP71(blue). The mean and standard deviations of the comparisons is 0.113 +/-0.062 m/s.

Figure 7. EM710 SVP71 vs uCTD real-time SV comparisons



A new profile was collected at approximately 4 hours increments with the uCTD. There was very little variability throughout the day, or from day to day, as observed in Figure 8 below. In this figure, all sound speed profiles acquired during survey H12757 are plotted together to show the overall consistency of the SV casts. The full SV profiles are displayed on the left, and the same plot zoomed into the upper 100+ meters on the right. In the uppermost 100m, there is little more than one-half a meter per second of variability at each depth interval.

Figure 8. H12757 SV cast plot



B2.h Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the M-I907-NF-15 DAPR

B3. ECHO SOUNDING CORRECTIONS

B3.a Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the M-I907-NF-15 DAPR.

B3.b Calibrations

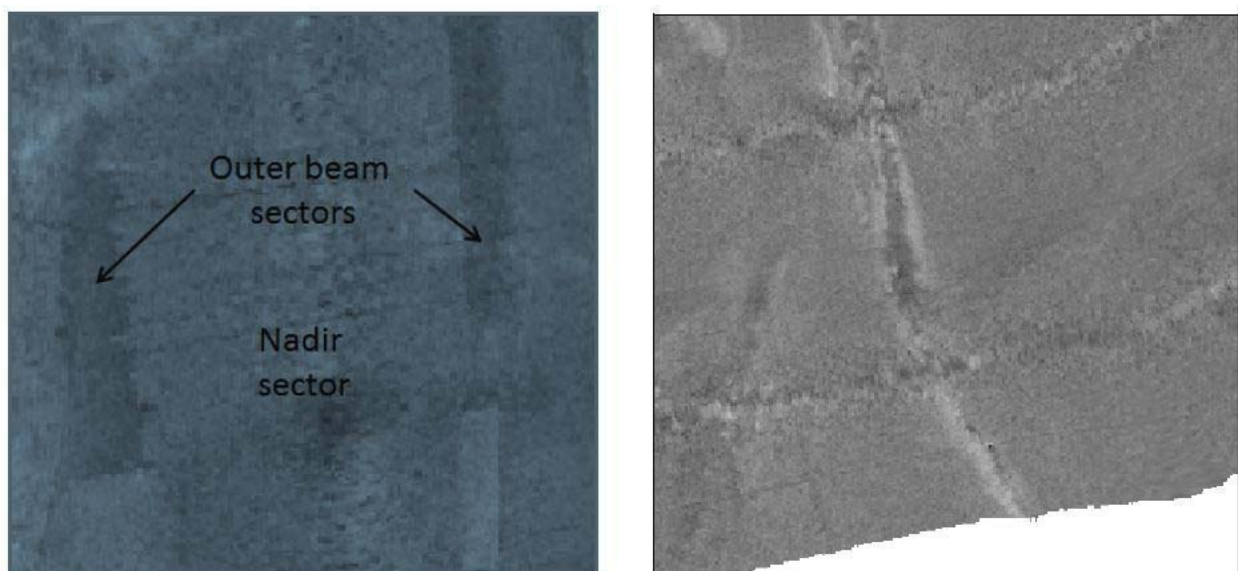
No additional calibration tests were conducted beyond those discussed in the M-I907-NF-15 DAPR.

B4. BACKSCATTER

MBES backscatter was logged in the SIS .all formats. Data was processed and evaluated with a combination of Fledermaus FMGT and the Hypack implementation of Geocoder. The backscatter data was used in combination with the bathymetry to create Principal Component Analysis surfaces in GIS to delineate areas of difference. This information was then used to plan ROV transects to characterize benthic habitats in the surveyed regions.

The quality of the backscatter from the EM710 was compromised due to the EM710's use of slightly different frequencies across the swath. The variable frequencies used in different ping modes and MBE sectors are evident in the backscatter. The negative effect of the use of variable frequencies in the backscatter was mitigated by a series of adjustments to each ping mode across the swath, one for each ping mode employed by the EM710. The adjustments to the backscatter strength were effective, and the delineations of the sectors were resolved. However, the backscatter adjustments entered into SIS did not always "stick" and the original default values would occasionally reappear within SIS degrading the quality of the backscatter.

Figure 9. EM710 seafloor backscatter before (left) and after (right) applying sector adjustments



B5. DATA PROCESSING

B5.a Software Updates

There was a combination of CARIS 7.1.2 SP2 and 9.0.9 used to convert and process the data for this sheet. This data set was post-processed and is delivered with CARIS version 9.0.18.

B5.b Surfaces

Bathymetric grids were created relative to Mean Lower Low Water (MLLW) in CUBE format using complete coverage resolution requirements as described in the HSSD and using the CUBEParams_NOAA.xml file. BAGs were exported from CARIS with the identical name as the surface from which they were derived from.

Finalized CUBE surfaces are delivered with and without depth thresholds. CUBE surfaces appended with “Final” are not depth thresholded. Depth thresholds were applied as defined in the HSSD and are appended with the “DT” description. The NCCOS and CCMA groups prefer not to have depth thresholded surfaces for benthic habitat classification reasons.

Thorough analysis determined that the 2m resolution CUBE surface is an accurate representation of the seafloor in the shallow regions and the surface honors the shoalest reliable soundings within 1/2 of the allowable TVU, therefore no designated sounding were used on this survey sheet. Table 7 lists the finalized CUBE surfaces submitted with this survey.

Table 7. H12757 MBES CUBE surfaces

Surface Name	Resolution
H12757_8m_MBE_MLLW_Final	8.0m
H12757_16m_MBE_MLLW_Final (DT)	16.0m
H12757_32m_MBE_MLLW_Final (DT)	32.0m

C. VERTICAL AND HORIZONTAL CONTROL

No HorCon or VertCon operations were performed for this survey. A summary of horizontal and vertical control for this survey follows.

C1. VERTICAL CONTROL

The vertical datum for this project is MLLW 83-01 NTDE. Tidal data was applied with a finalized discrete zoning ZDF file supplied by CO-OPS with verified tides values obtained from the assigned NWLON tide gauges. Information related to tides and tide correctors is included in Tables 9, 10 and 11.

Table 8. Tide stations

Station Name	Station ID
Christiansted, USVI	9751364
Lime tree Bay, USVI	9751401
San Jaun, PR	9755371

Table 9. HIPS water level files

File Name	Status
9751364.tid	Verified
9751401.tid	Verified
9755371.tid	Verified

Table 10. HIPS zoning files

File Name	Status
I907NF2015CORP.zdf	Final Zoning

C2. HORIZONTAL CONTROL

The horizontal datum for this project is North American Datum of 1983 (NAD83) projected in Universal Transverse Mercator (UTM) Zone 20 with units in meters. All of the real-time navigation data were collected in DGPS mode. DGPS corrections were received from a U.S. Coast Guard transmission station broadcasting at 295 kHz located at Isabel, Puerto Rico.

D. RESULTS AND RECOMMENDATIONS

D1. CHART COMPARISON

The chart comparison was performed by comparing a shoal biased sounding layer generated in CARIS to the largest scale chart affecting the charts listed in the Project Instructions. A 900-meter shoal sounding surface of the entire survey area was generated from the finalized 16m CUBE depth surface. The chart comparison was conducted by visually reviewing the resultant surface and charted soundings.

D1.a Raster Charts

The raster chart comparison was performed by comparing RNCs covering the survey area to H12757 using visual comparison techniques. The RNCs compared are listed in Table 11.

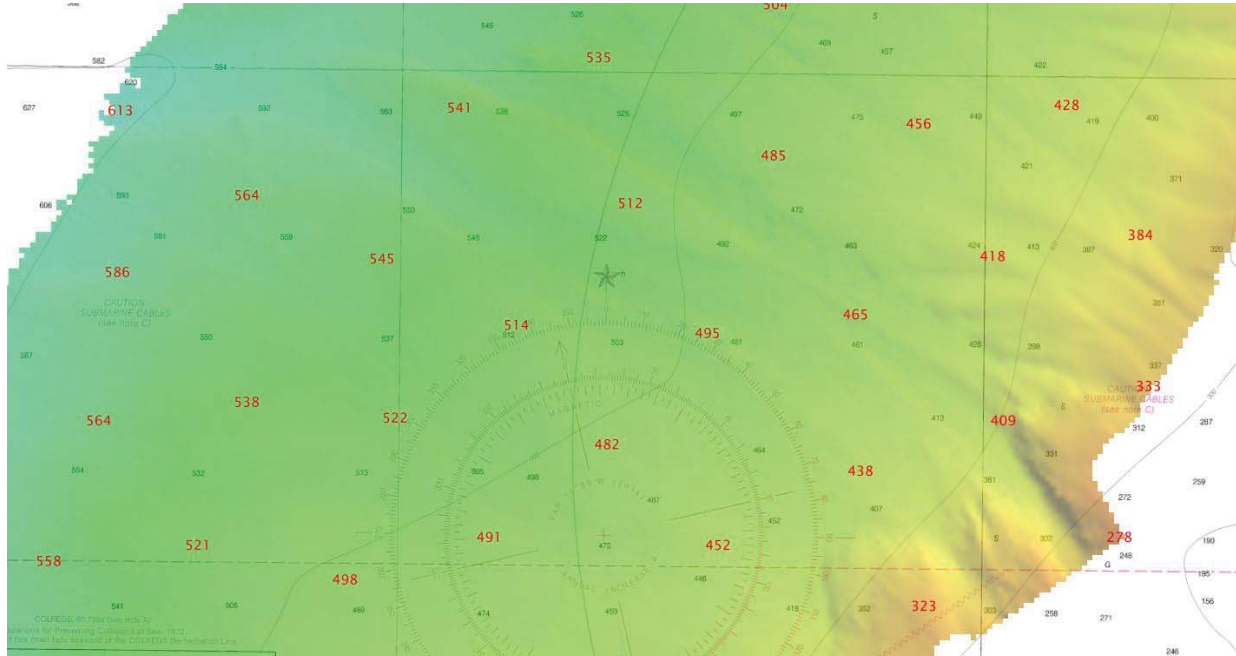
Table 11. RNCs Compared to H12757

Chart	Scale	Edition Number	Edition Date	LNM Date	NM Date
25644	1:20,000	15	01/2014	02/03/2015	02/14/2015
25641	1:100,000	29	09/2013	01/20/2015	01/31/2015
25640	1:326,856	45	01/2013	01/20/2015	01/31/2015

RNC 25644

Surveyed soundings generally compare well with RNC chart 25644, considering the depths of water within H12757.

Figure 10. 25644 chart comparison red soundings from shoal biased H12757 surface



RNC 25641

Surveyed soundings generally compare well with RNC chart 25641, considering the depths of water within H12757.

Figure 11. 25641 chart comparison East, red soundings from shoal biased H12757 surface

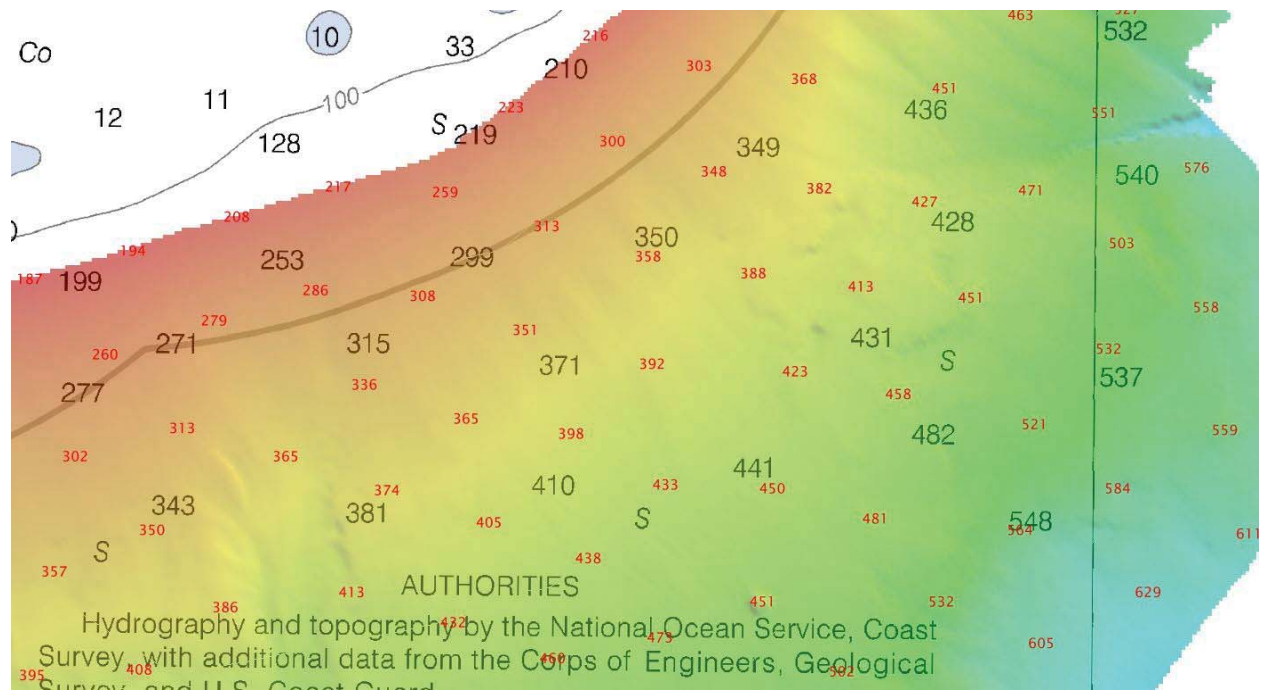
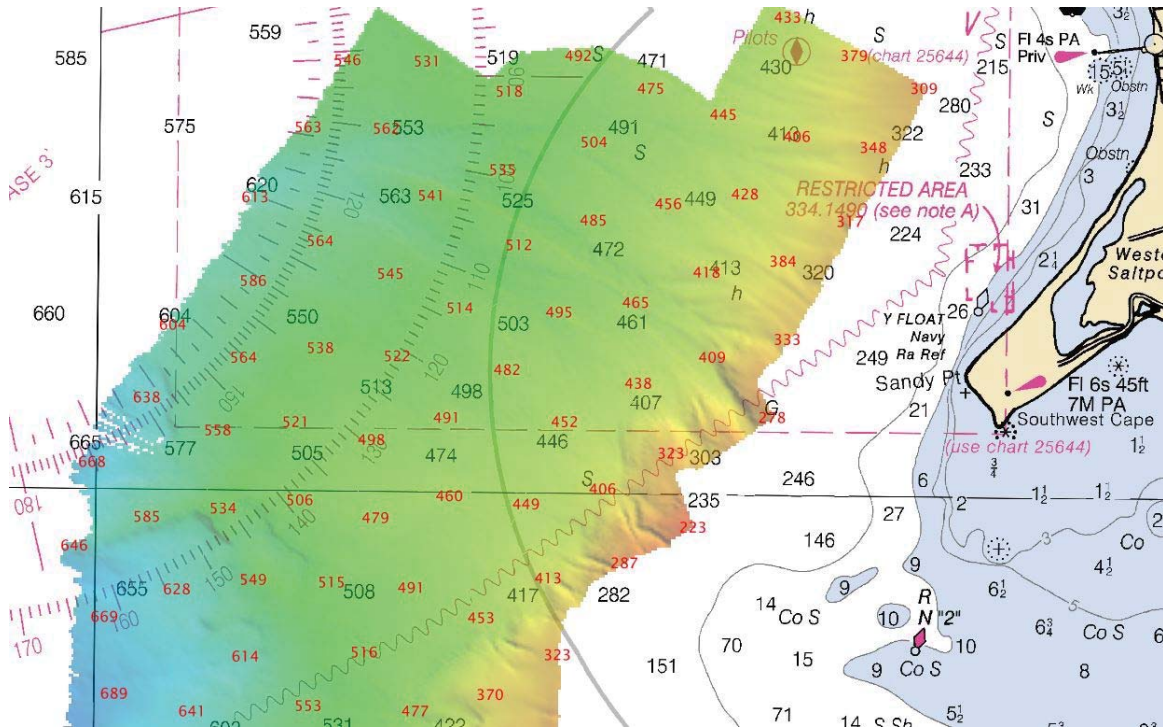


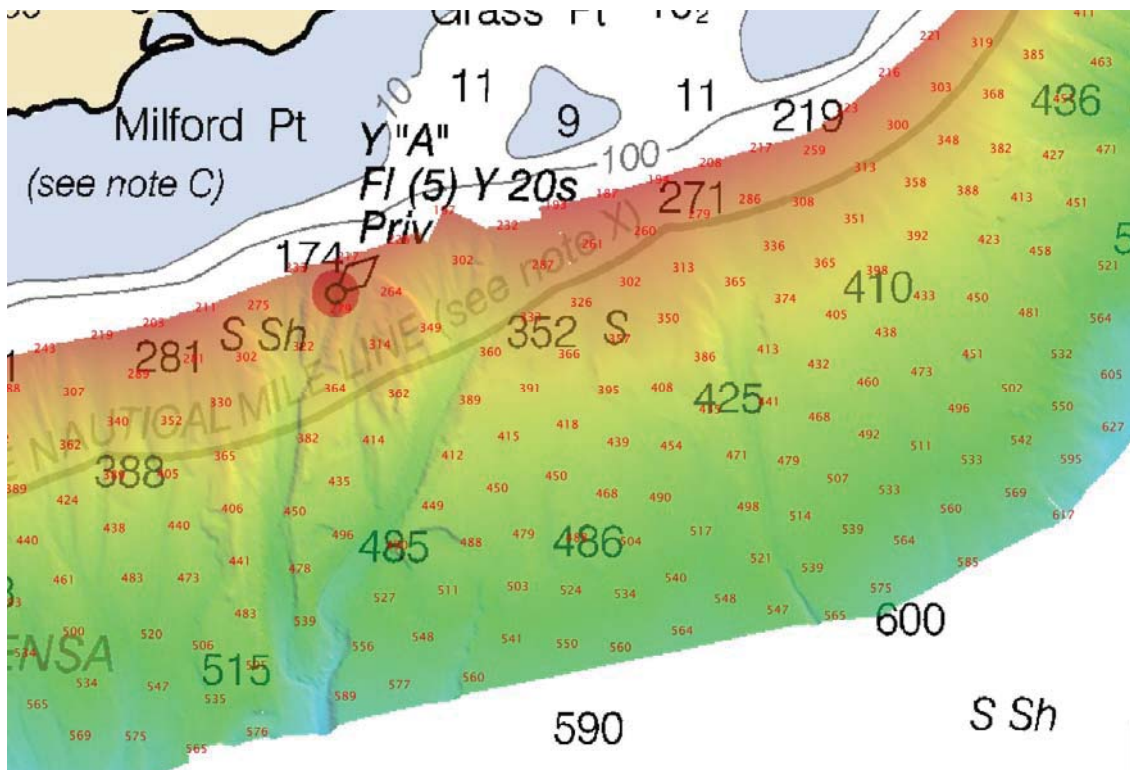
Figure 12. 25641 chart comparison West, red soundings from shoal biased H12757 surface



RNC 25640

Surveyed soundings generally compare well with RNC chart 25640, considering the depths of water within H12757.

Figure 13. 25640 chart comparison West, red soundings from shoal biased H12757 surface



D1.b Electronic Navigational Charts

Table 12 lists the ENC's compared to H12757

Table 12. ENC's Compared to H12757

ENC Name	Scale	Edition Number	Update Application Date	Issue Date
US3PR10M	1:326,856	11	05/06/2013	10/23/2014
US3PR10M	1:326,856	11	05/06/2013	10/23/2014
US5PR13M	1:20,000	9	06/13/2014	06/13/2014

An ENC to RNC comparison reveals that the same sounding information was used to derive both types of charts and the agreements noted previously are also evident in the ENC charts.

Figure 14. RNC 25640 (black) vs ENC US3PR10M (red) chart comparison and overlay

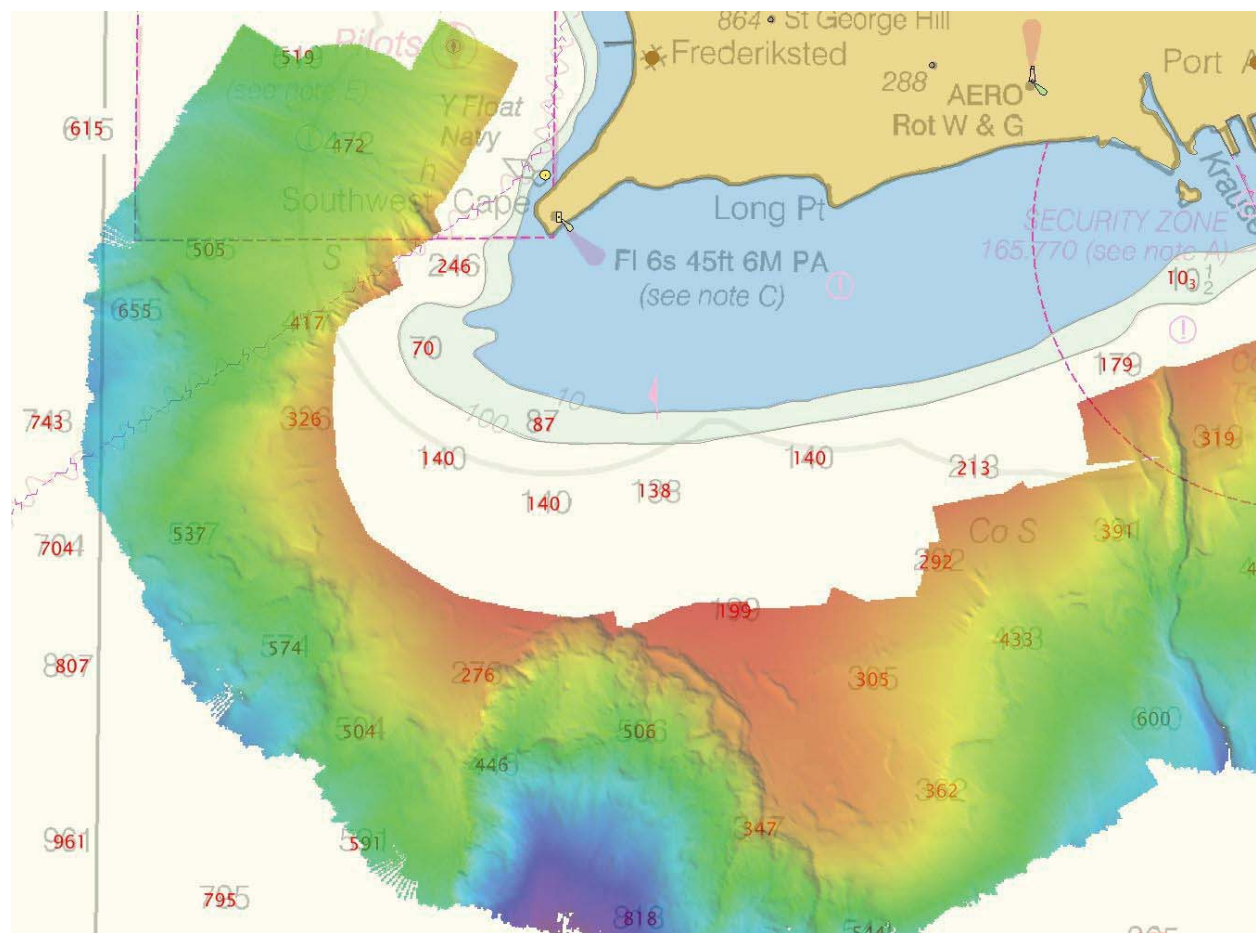


Figure 15. RNC 25641 (black) vs ENC US4PR11M (red) chart comparison and overlay

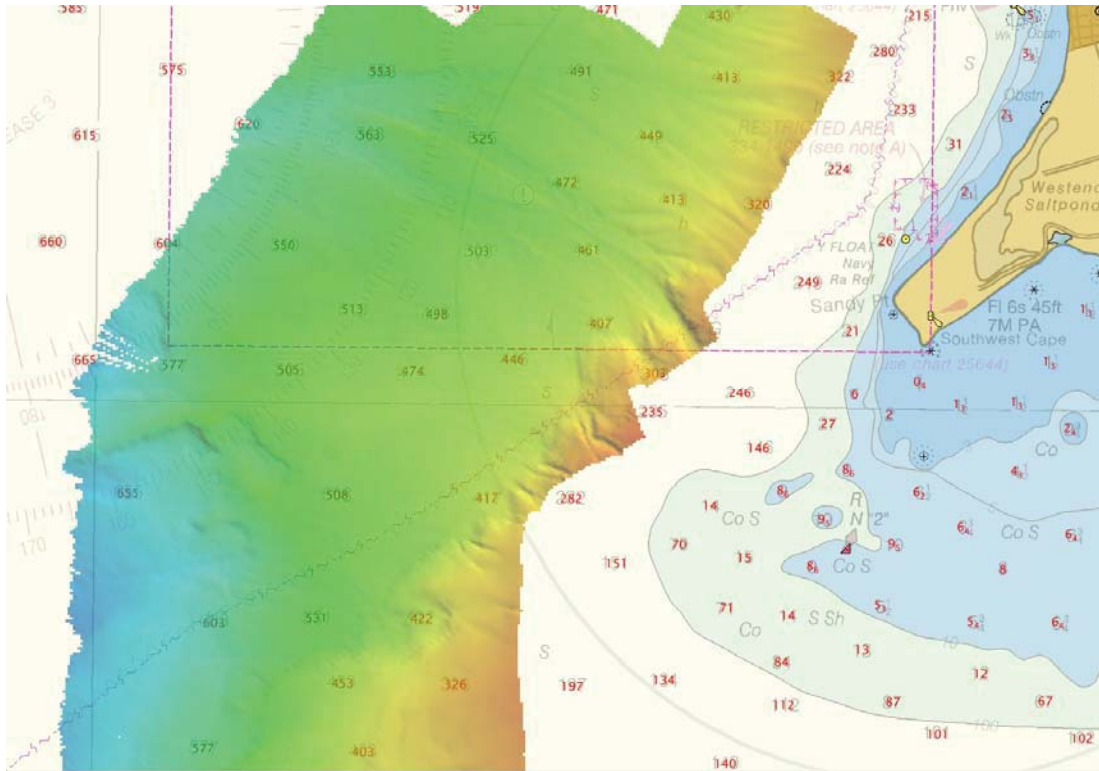
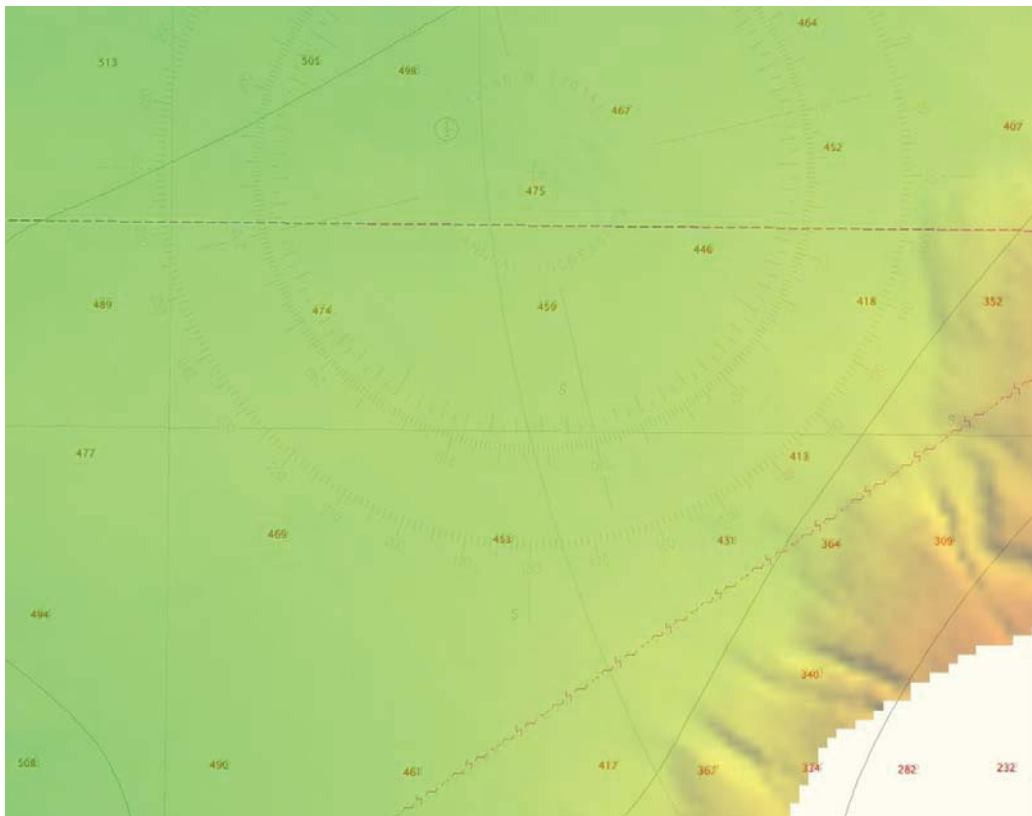


Figure 16. RNC 25644 (black) vs ENC US5PR13M (red) chart comparison and overlay



D1.c AWOIS Items

There were no AWOIS investigations required for this project.

D1.d Charted Features

No charted features were located within the H12757 survey area.

D1.e Uncharted Features

No uncharted features were located within the H12757 survey area.

D1.f Dangers to Navigation

No Dangers to Navigation (Dtons) were reported for this survey.

D1.g Shoal and Hazardous Features

No shoals or potentially hazardous features were located within the H12757 survey area.

D1.h Channels

The H127567survey area does not contain any anchorage areas, maintained navigation channels or channel lines.

D1.i Bottom Samples

There was no bottom sample requirement for this survey.

D2. ADDITIONAL RESULTS

D2.a Shoreline

Shoreline investigation was not assigned for this project.

D2.b Prior Surveys

Aside from previously discussed charted comparisons, no comparisons with prior surveys were conducted.

D2.c Aids to Navigation

No Aids to Navigation (Atons) were charted or located within the H12757 survey area.

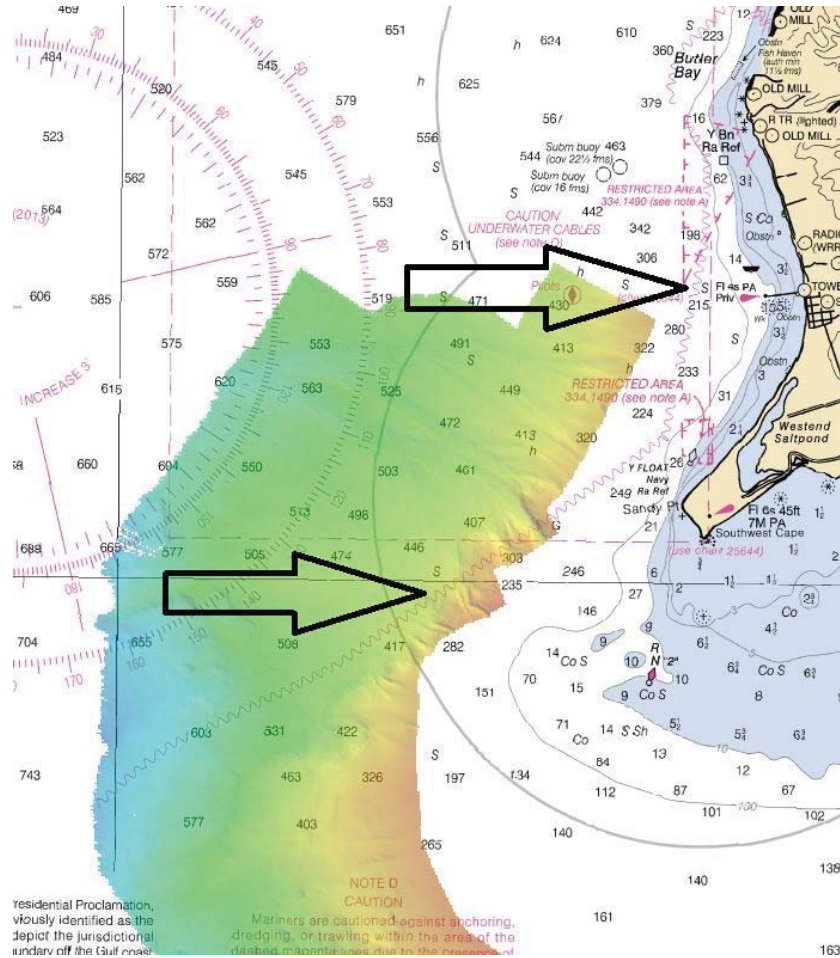
D2.d Overhead Features

There were no overhead bridges, cables, or other structures which would impact overhead clearance in the survey area.

D2.e Submarine Features

The H12757 had a cable route within the sheet limits. The cable was not observed on the seafloor and no free spans were detected in the MBES data.

Figure 17. Cable route crossing



D2.f Ferry Routes and Terminals

There were no ferry routes or terminals within the survey area.

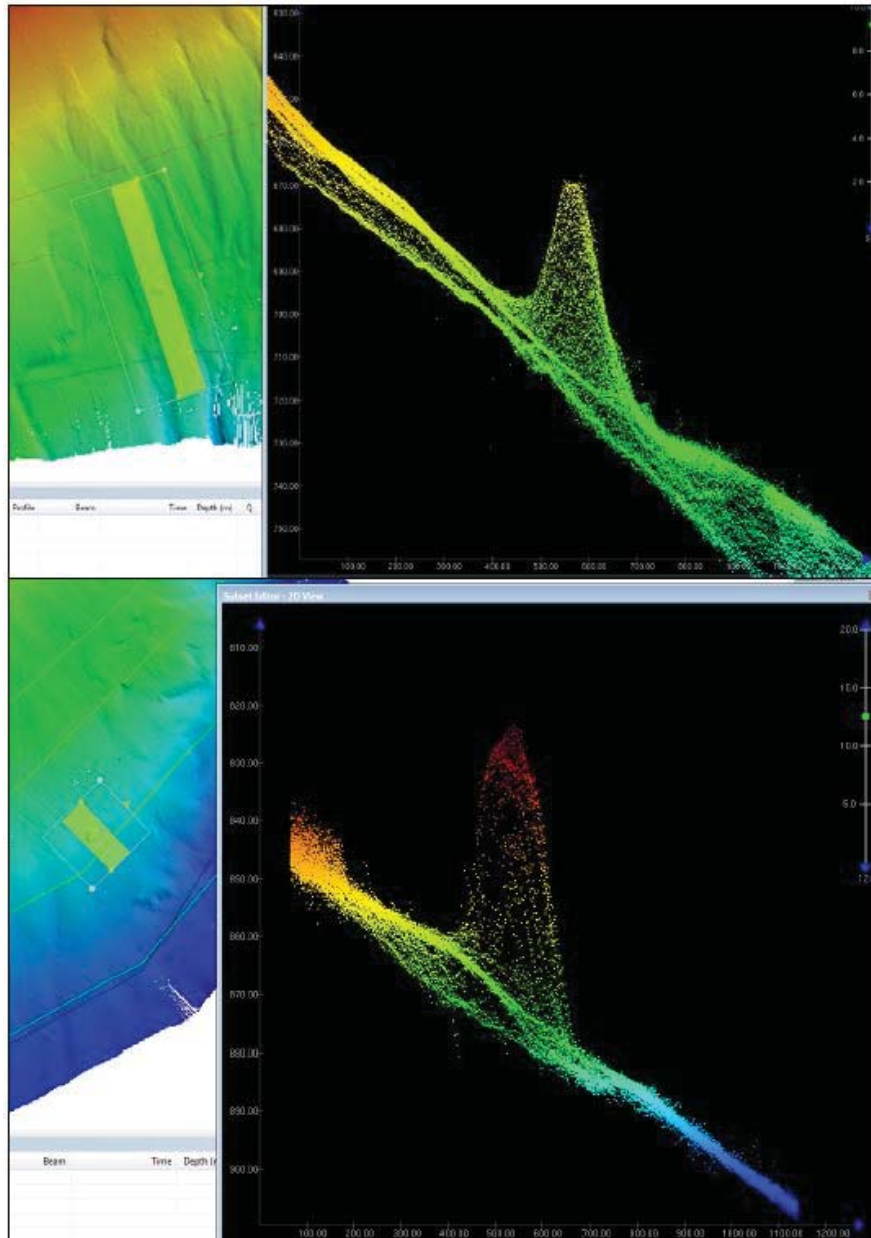
D2.g Platforms

There were no platforms within the survey area.

D2.h Significant Features

On two separate occasions, isolated, tall (25-50m height), pinnacle-like geological features were surveyed on a smooth and sloping area south-east of St. Croix. Displayed in Figure 18 is a subset section of each pinnacle. The first pinnacle is located at N17.634, W064.739 at depth of 672m, the second is located at N17.675, W64.526 at a depth of 827m.

Figure 18. Surveyed pinnacles



No additional information of scientific or practical value was observed during the survey other than the benthic habitat characterization maps created by the CCMA scientific party. No anomalous tidal or environmental conditions were observed during the survey that impacted the quality of the survey.

D2.i Construction and Dredging

There was no construction or dredging activities observed during survey operations.

D3. NEW SURVEY RECOMMENDATIONS

It is recommended that this survey H12757 is used to supersede and update the existing nautical charts within the survey area.

D3.a Inset Recommendations

No inset recommendations are requested at this time for the surveyed area.

E. APPROVAL SHEET

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division's Field Procedures Manual, and the Hydrographic Surveys Specifications and Deliverables. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

The Data Acquisition and Processing Report for M-I907-NF-15 is submitted separately and contains additional information relevant to this survey.

Michael Stecher
NOAA Contractor
Lead Hydrographer
CCMA Biogeography Branch

**Mike
Stecher**

Digitally signed by Mike Stecher
DN: cn=Mike Stecher, o,
ou=Solmar Hydro Inc,
email=solmarhydro@gmail.com,
c=US
Date: 2015.11.17 14:15:15 -08'00'

APPENDIX I
TIDES AND WATER LEVELS



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Ship NANCY FOSTER (MOA-NF)
439 West York St
Norfolk, VA 23510-1145

August 17, 2015

MEMORANDUM FOR: Gerald Hovis, Chief, Products and Services Branch, N/OPS3

FROM: M Stecher, NOAA Ship NANCY FOSTER (MOA-NF)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final zoning in MapInfo and .MIX format
3. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

<Unknown 'Data Transmit Address' (Pydro: Config...PSS Metadata)>

These data are required for the processing of the following hydrographic survey:

Project No.: M-_I907-NF-15
Registry No.: H12757
State: Virgin Islands
Locality:
Sublocality: Southern approaches to St Croix

Attachments containing:

- 1) an Abstract of Times of Hydrography,
- 2) digital MID MIF files of the track lines from Pydro



Year_DOY	Min Time	Max Time
2015_087	22:45:34	23:59:30
2015_088	00:00:40	23:58:48
2015_089	00:03:30	23:45:33
2015_090	00:01:57	21:28:22
2015_091	02:30:07	04:02:31



TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 25, 2015

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: M-I907-NF-2015
HYDROGRAPHIC SHEET: H12757

LOCALITY: Southern Approaches to st. Croix, US Virgin Islands
TIME PERIOD: March 28 - April 1, 2015

TIDE STATION USED: 975-1401 Lime Tree Bay, USVI
Lat. 17° 41.7' N Long. 64° 45.2' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.214 meters

TIDE STATION USED: 975-1364 Christiansted, USVI
Lat. 17° 44.9' N Long. 64° 41.9' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.220 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project M-I907-NF-2015, H12757, during the time period between March 28 and April 1, 2015.

Please use the zoning file I907NF2015CORP submitted with the project instructions for M-I907-NF-2015. Zones SCI1 through SCI13 are the applicable zones for H12757.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

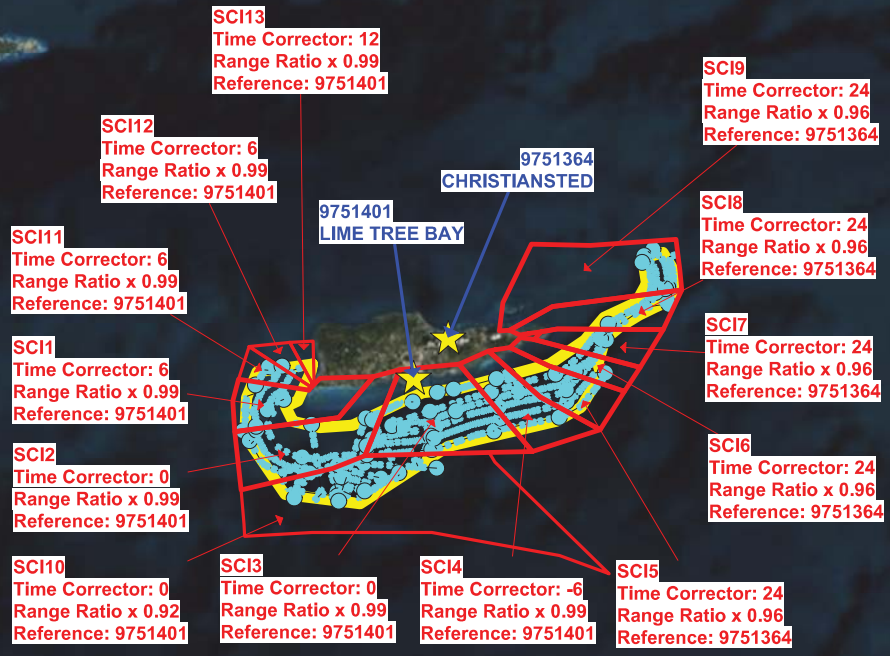
HOVIS.GERALD.THOMAS.JR.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.JR.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.JR.1365860250
Date: 2015.08.31 10:13:38 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH



**Preliminary as Final Tidal Zoning
for M-1907-NF-15, H12757
Southern Approaches to
St. Croix, Virgin Islands**



APPENDIX II

SUPPLEMENTAL SURVEY RECORDS
AND CORRESPONDENCE

NONE

APPROVAL PAGE

H12757

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- H12757_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12757_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: _____

Lieutenant Commander Briana Welton, NOAA
Chief, Atlantic Hydrographic Branch